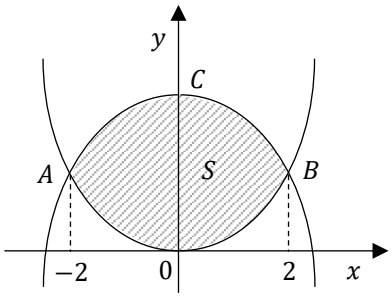
Problem:

Find the area of the figure, formed by the graphs of the functions $y = x^2,\ y = 8 - x^2$.

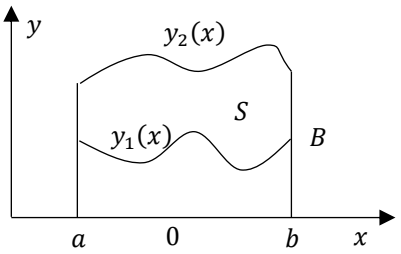
Solution:



$y = x^2, \qquad y = 8 - x^2$

Let's first find the intersection points of these graphs:

$x^2 = 8 - x^2 \Rightarrow\ x^2 = 4, \qquad x = \pm 2$



$$S = \int_a^b \big(y_2(x) - y_1(x)\big)dx$$

$\Rightarrow$ the area of our figure will be:

$$S = \int_{-2}^{2} (8 - x^2 - x^2)\,dx = 8x\Big|_{-2}^{2} - \frac{2}{3}x^3\Big|_{-2}^{2} = \frac{64}{3}, \qquad S = \frac{64}{3}.$$

Answer: $S = \frac{64}{3}$.